PROMOTING ORAL HEALTH THROUGHOUT THE LIFESPAN

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Promoting Oral Health Throughout the Lifespan

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Introduction

Oral health is an essential component of health for people of all ages. No one can achieve optimal health without freedom from the burden of oral diseases.[1] Although most of these diseases are preventable, they still cause millions of Americans to experience needless pain and suffering, difficulty in chewing and, often as a result, poor nutrition, higher health care costs, loss of self-esteem, and decreased economic productivity.[2] Emerging research evidence also suggests possible associations between periodontitis (severe gum disease) and chronic diseases such as diabetes and cardiovascular diseases, as well as increased risks for premature births and low birth-weight babies among pregnant women with such disease.

Although community preventive measures such as water fluoridation, school-based dental sealant programs, and smoking prevention and cessation programs can significantly reduce rates of oral diseases, these measures are often underused or unavailable to those who need them most. State health departments, which play an important role in providing community preventive services, need an adequate oral health infrastructure to carry out core public health activities. These activities include monitoring the population's oral health status and behaviors, developing effective programs to improve the oral health of children and adults, evaluating program accomplishments, and informing key stakeholders, including policy makers, of program results.

This chapter provides information on community practices that have been effective in preventing oral disease, as well as information on the essential components of effective state oral health programs.

Burden

Although Americans make about 500 million dental visits each year[3] and spent an estimated $68 billion on dental services in 2002,[4] many do not have adequate access to or avail themselves of measures known to prevent oral diseases and conditions. Dental caries (decay) remains one of the most common diseases among U.S. children.[1] This preventable health problem can begin in infancy, as soon as the primary teeth erupt. Eighteen percent of children aged 2–4 years have experienced dental decay,[5] as have 78% of 17-year-olds.[1] Left untreated, dental decay in children can cause pain, malnutrition, and poor appearance, all of which can lower a child's self-esteem and ability to succeed.

Serious oral health problems also occur among adults. Approximately one in three U.S. adults has untreated dental decay and is in need of preventive and treatment services.[5] In 1995, dental visits and dental problems resulted in productivity losses of approximately $3.7 billion for hours missed from work and $1.8 billion for days of restricted activity.[6] Gingivitis, characterized by red, inflamed gums and often accompanied by pain, swelling, and bleeding, is found in 48% of adults aged 35–44 years. If not controlled, gingivitis may lead to destructive periodontal diseases and eventual tooth loss. Although the rate of tooth loss among Americans has decreased in recent years, as many as 30% of those aged 65 years or older have lost all their natural teeth.[5]

In addition, about 30,000 Americans are diagnosed with and 8,000 die of oral and pharyngeal cancers each year (Table 1). These cancers are the fourth most common types of cancer among black men and the seventh most common among white men.[1] Survival is closely related to the stage of the cancer when it is diagnosed: the 5-year survival rate is only 23% for those with disease that has spread, compared with 82% for those with localized disease. Even though oral cancers occur in sites that tend to make them easy to diagnose and treat, only about 34% are localized at the time of diagnosis.[7] The surgical treatment often needed by those diagnosed at later stages can result in substantial functional impairment and permanent disfigurement. Potential problems include loss of parts of the tongue and jawbones, loss of taste, loss of ability to chew, difficulty with speech, and pain. People who undergo surgery for oral cancer must also often cope with an altered appearance and rehabilitation and are at risk for depression.[1]

Oral health and access to preventive dental services vary substantially by race and by various sociodemographic factors. The percentage of children aged 6–8 years who have untreated dental decay was found to be substantially higher among Hispanics (43%) and African Americans (36%) than among whites (26%).[5] Among low-income children aged 5–17 years, 44% have untreated dental decay.[1] In 1993, only 20% of Medicaid-eligible children received at least one preventive dental service, such as the application of fluoride or sealants.[8]

Oral health disparities also exist among adults. Those with only a high school education or less are more likely than those with at least some college education to have destructive periodontal disease, more likely to have lost all their teeth if they are aged 65 or older, and less likely to report receiving examinations that can detect oral cancer.[5] For men with oral and pharyngeal cancers, the 5-year survival rate is lower among blacks (29%) than among whites (58%); death rates for these diseases peak among black men aged 55–64 years, which is about 20 years sooner than among white men.[7]

Americans' access to and use of dental services varies by race and ethnicity, income, and insurance coverage. The most frequent reasons cited for not using dental services are perceived lack of a dental problem, edentulism (total tooth loss), and cost of

Table 1. Incidence Rates of Oral and Pharyngeal Cancers per 100,000, by Race and Gender, 1992–1999

Race	Men	Women
Black	21.9	6.8
White	16.7	6.7
Asian and Pacific Islander	13.5	5.8
American Indian and Alaska Native	13.0	3.6
Hispanic	10.3	3.8

Note: Age-adjusted to the 2000 U.S. standard population.
Source: *SEER Cancer Statistics Review, 1973–1999.* Available at seer.cancer.gov/csr/1973_1999.

care.[1] Dental insurance coverage is associated with increased use of services.[3, 9] In a 1995 survey, 78% of people with insurance reported having seen a dentist in the prior year, compared with only 58% of those without insurance.[9] Insurance coverage is highest among whites (42%), people with more than a high school education (51%), and families with yearly incomes of $35,000 or more (61%). Coverage is lowest among Hispanics (30%) and blacks (32%). Age-related disparities in coverage also exist; people aged 65 or older reported the lowest levels of dental insurance coverage, and dental services covered through Medicare are very limited. Despite current levels of private insurance and recent improvements in dental care access through publicly funded insurance programs such as Medicaid and the State Children's Health Insurance Program (SCHIP), for each child without medical insurance, 2.5 children are without dental insurance.[1]

Healthy People 2010 Objectives

Healthy People 2010 includes 17 objectives that reflect a commitment to preventing and controlling oral diseases and improving Americans' access to dental services. These objectives specify targets for improvements in several critical areas, including the following:

- Rates of dental decay among children, adolescents, and adults.
- The prevalence of gum disease and tooth loss.
- Early detection of mouth and throat cancers and death rates from these cancers.
- The percentage of people who receive preventive and other dental services.
- The percentage of children who have received dental sealants.
- The percentage of people who receive optimally fluoridated water.

Other objectives target increases in the number of school-based health centers, community health centers, and local health departments that have an oral health component; increases in the number of state, tribal, and local health agencies that have an effective dental public health program directed by a dental public health professional; and increases in the number of states that have an oral and craniofacial surveillance system. Other *Healthy People 2010* focus areas such as cancer, diabetes, nutrition, and tobacco use also contain objectives related to oral health.

Prevention Opportunites

Primary, Secondary, and Tertiary Prevention Interventions

Much can be done to reduce the burden of oral diseases and achieve the *Healthy People 2010* objectives by using a multifaceted approach that includes community-based initiatives, self-care, and professional care. The positive impact of community water fluoridation on the prevalence and severity of dental decay in the United States has been called one of 10 great public health achievements of the 20th century.[10] Other *primary prevention* measures that effectively prevent dental decay include the application of dental sealants and the use of oral health products that contain fluoride, such as toothpaste, mouth rinses, dietary fluoride supplements, and professionally applied varnishes and gels. A balanced diet that limits snacks high in sugars and carbohydrates also helps prevent dental decay. In addition, self-care practices that include regular tooth brushing and use of dental floss play a crucial role in maintaining the health of gums, as do regular professional cleanings. Programs designed to prevent people from starting to use tobacco or to help them quit can also help prevent oral cancer and periodontal diseases. Because alcohol, either alone or in combination with tobacco, increases users' risk for oral cancer, strategies to promote responsible alcohol use also are relevant to oral health.

Secondary prevention measures include a variety of mechanical, chemical, and radiological approaches that can eliminate the need for extensive care. Early diagnosis and treatment of oral diseases, best accomplished through periodic examinations, reduce patients' risk for tooth loss, systemic health effects, and even, in rare cases, death. Removing decayed tissue and restoring structure and function at early stages of tooth decay can prevent tooth loss or the

need for more extensive treatment. Secondary prevention measures to diagnose and treat periodontal diseases (gingivitis and periodontitis) include physical examination, periodontal probing, X-ray examination, microbiologic and histologic testing, professional removal of irritants including hard (i.e., tartar) and soft (i.e., plaque) deposits, and local application of antimicrobial agents. Physical and visual examinations are also effective measures for detecting oral cancer at its early, most treatable stages. Assessment of past and present tobacco and alcohol use is a key intervention for identifying those who are at highest risk for oral cancer and most likely to benefit from physical examination and early detection. In cases of small or suspicious lesions, excisional biopsy can be performed.

Avoiding disability from oral diseases in intermediate and late stages requires *tertiary prevention* measures, which include more aggressive and costly surgical, radiological, and chemical interventions. Restorative care for people with advanced tooth decay ranges from crowns to prosthetic devices and implants when decay results in tooth loss. Like cavities, periodontitis can also be treated by a variety of surgical procedures or by administering antimicrobial agents either locally or systemically. Tertiary treatment for advanced oral cancers can involve multiple surgical procedures, radiation, and chemotherapy. These measures can result in mild to severe functional impairments and disfigurement that requires reconstructive surgery and rehabilitation.

Community-Based Interventions and Essential Strategies

Oral health programs at the state level should concentrate on population-based, primary prevention strategies and interventions. However, such programs may also need to provide secondary prevention services that require partnerships with external organizations such as local health departments, community health centers, and professional associations of dentists and other health care providers. In determining priorities and selecting strategies for oral health programs, public health officials should consider findings from surveillance activities and needs assessments and, when possible, select those strategies and interventions shown to be effective and efficient. When they choose to include a promising but relatively unevaluated prevention measure, these officials should be especially diligent in conducting evaluations to determine the effectiveness of the measure.

As part of a cooperative agreement with CDC, the Association of State and Territorial Dental Directors (ASTDD) has launched the Best Practices Project, which is preparing a series of reports on proven and promising best practices for state and territorial oral health programs. The objective of this project is to help states achieve *Healthy People 2010* objectives, meet the "National Oral Health Call to Action" of the Surgeon General, and build infrastructure capacity at both the state and local levels. The series of reports, which will be provided on the organization's Web site (www.astdd.org) in 2003, will summarize the current state of evidence on dental public health approaches and share ideas from successful practices reported by state and territorial oral health programs. The first set of ASTDD reports will include dental public health approaches to fluoridation, school fluoride programs, school sealant programs, oral health surveillance, state oral health plans, state oral health coalitions and collaborative partnerships, oral cancer prevention and control, and access to care.

Fluoridation. Fluoridation of community drinking water, a major factor in the dramatic decline of tooth decay during the second half of the 20th century, remains among the most successful oral health interventions.[10] Although 65.8% of Americans on public water systems currently have access to fluoridated water, approximately 100 million Americans are still without its benefits.[11] Community water fluoridation is an ideal public health intervention because it is effective, safe, and inexpensive and generally requires no effort or direct action from those who receive its benefits. Thus it also tends to reduce disparities in rates of dental decay because the entire population benefits

regardless of the health literacy or financial resources of its members.[10, 12] The Task Force on Community Preventive Services, an independent nonfederal task force, strongly recommends that population-based interventions to prevent or control tooth decay include community water fluoridation. This recommendation is based on the results of the task force's systematic review of studies on fluoridation, which showed that community water fluoridation reduced rates of tooth decay by 30%–50% among children of varying socioeconomic status.[13]

In an economic analysis of fluoridation, researchers calculated fluoridation-related "cost savings" as the difference between the annual estimated cost of averted disease and the cost of fluoridation per person (Table 2). They calculated the cost of averted disease using an estimated annual increment of dental decay in nonfluoridated communities, a lower annual increment of dental decay in fluoridated areas, and the expected lifetime cost of maintaining amalgam fillings.[12]

In *Engineering and Administrative Recommendations for Water Fluoridation*,[14] CDC recommends that states take the following actions to establish and maintain a fluoridation program:

- Designate a state fluoridation administrator to be responsible for program management and serve as liaison with other state and federal agencies.
- Routinely inspect municipal water plants and provide technical assistance to plant operators.
- Provide training and continuing education for operators of municipal water plants.
- Establish and maintain a system to monitor fluoride concentrations in the water.
- Promote the adoption of community water fluoridation in nonfluoridated areas.

Dental Sealant Programs. Although numerous studies have shown dental sealants to be effective in reducing tooth decay,[15–19] the Third National Health and Nutrition Examination Survey, 1988–1994, showed that less than 25% of U.S. children had sealants[5] and that sealants were even less common among children of some racial and ethnic groups. *Healthy People 2010* Objective 21-8 calls for increasing the proportion of children with dental sealants on their permanent molars to 50%.[5] Sealants can be easily applied in schools, dental offices and clinics, and mobile dental units. In its review of intervention studies for evidence of effectiveness, the Task Force on Community Preventive Services found school-based and school-linked sealant programs to be effective in reducing tooth decay among children and adolescents at varying levels of risk and from different socioeconomic backgrounds. Participation in these programs was associated with a 60% median decrease in decay on the horizontal surfaces of molars and premolars of posterior (rear) teeth. As a result of its review, the task force strongly recommended that states establish school-based or school-linked sealant programs.[13]

Table 2. Annual Water Fluoridation Costs per Person and Cost Savings for Communities of Various Sizes

Community Population	Cost of Fluoridation	Cost Savings
<5,000	$3.17	$15.95
5,000–9,999	$1.64	$17.48
10,000–20,000	$1.06	$18.06
>20,000	$.50	$18.62

Note: Reported in 1995 dollars.
Source: Adapted from Griffin et al., 2001.[12]

A State Oral Health Program in Action

"Healthy Smiles for **Wisconsin**" is a CDC-supported statewide program to improve the oral health of Wisconsin children through school and community partnerships. The program is a collaboration between Wisconsin's Department of Public Instruction and its Department of Health and Family Services. One major partnership is the statewide Healthy Smiles for Wisconsin Coalition, comprising more than 25 state, public, and private agencies and organizations within the state. The coalition's "Seal a Smile" initiative, started in October 2000, enabled 40 community dental sealant programs to be established during the 2000–2001 school year. As of fall 2001, more than 5,500 school children in 40 counties across Wisconsin had received dental sealants through this sustainable program.

States should develop sealant programs that both educate people about sealants and facilitate sealant application. To increase public awareness of the effectiveness and availability of sealants to prevent tooth decay, state programs should use public education and targeted communications strategies. To help provide this clinical intervention, state programs should collaborate with community organizations and dental care providers. School-aged children in high-risk populations can be reached through school- and community-based programs. Many state public health programs already have the child health and educational resources necessary to promote oral health and address the oral health needs of school-aged children. States should build on existing coordinated school health programs initiated by CDC's Division of Adolescent and School Health within state departments of education or on similar programs to reach low-income, school-aged children who are at high risk for oral disease. By working with dental health providers and other community partners, such coordinated school-based or school-linked programs can provide oral health education, sealant applications, other preventive services, and treatment referrals for at-risk, school-aged children.

Oral Cancer Prevention and Control. Public health efforts have generally focused less on oral cancer than on other forms of cancer. But this form of cancer, which can result in disfigurement and disability as well as death, is associated with risk factors that can often be modified through public health intervention. States should play a role in educating people about oral cancer, its impact on the general population and high-risk populations, and the effectiveness of interventions. Oral health programs should collaborate with state cancer prevention and control programs to analyze oral cancer data from cancer registries, state public health surveys, Medicare, and health system organizations. The results of these analyses will allow them to define the extent of the problem, identify high-risk groups, integrate oral cancer issues into state comprehensive cancer control plans, and guide interventions. State oral health programs also should collaborate with tobacco control and alcohol abuse programs to ensure that those programs address oral cancer and to efficiently integrate prevention interventions across programs; such an approach helps to maximize the use of resources and eliminate duplication of effort. For example, state public health programs addressing oral health, cancer, tobacco use, and alcohol abuse should collaborate with each other and with partner organizations to encourage dental and other health care providers to regularly screen their patients for alcohol and tobacco use and to provide appropriate education, counseling, and referrals for people they identify as being at increased risk for oral cancers.

Infrastructure

Programs within state health agencies play a vital role in reducing oral health disparities and in improving their constituents' oral and overall health. These programs are positioned to link federal, state, and local resources and to direct and integrate the efforts of multiple organizations. To meet the oral health goals and objectives of *Healthy People 2010*, each state needs to have an oral health program with adequate resources to carry out effective population-based interventions.

A State Oral Health Program in Action

In the early 1990s, the **New Hampshire** Department of Health did not have an oral health program, and the state had one of the lowest rates of access to fluoridated water in the nation (24%). Not only did the state lack the capacity to plan, implement, and evaluate oral disease-prevention programs, but it also had little capacity to gather or analyze oral health surveillance information. In 1997, CDC began collaborating with the Health Resources and Services Administration (HRSA) to support the development of public health interventions, particularly community water fluoridation, in New Hampshire. With modest federal funding, the state hired a part-time program coordinator for oral health. CDC provided technical assistance on strategies for promoting community water fluoridation. In 1999, Manchester, the state's largest city, approved water fluoridation in an initiative election. CDC engineers then worked with state water department staff to design a fluoridation system, and Manchester implemented this system in 2000. Today, 43% of New Hampshire residents using public water systems are receiving fluoridated water. Also in 2000, a CDC epidemiologist was assigned to New Hampshire with instructions to devote 25% of his time to oral health. In 2001, New Hampshire hired a full-time director for the state's oral health program.

Two publications by ASTDD describe how to develop state and local oral health programs. The first, *Building Infrastructure and Capacity in State and Territorial Oral Health Programs*,[20] describes the public health functions of state oral health programs and the resources they need to maintain program infrastructure and capacity. The second, *Guidelines for State and Territorial Oral Health Programs*,[21] outlines the core public health functions that are most pertinent for state oral health programs and describes associated activities. The following are some of the core public health functions and activities that ASTDD cites as being most essential to establishing and maintaining a state oral health program:

- Maintain an adequately staffed oral health unit skilled in performing public health functions.
- Ensure that the program staff has the capacity and expertise to effectively address oral health needs.
- Establish and maintain an oral health surveillance system for ongoing monitoring, evaluation of interventions, and timely communication of findings.
- Build linkages with partners interested in reducing the burden of oral diseases by establishing a state advisory committee or work group and community coalitions.
- Develop a state oral health plan through a collaborative process.
- Educate the public and policy makers about oral health problems and build support for policies and resources to overcome them.
- Support the implementation of services that focus on primary and secondary prevention.
- Evaluate the effectiveness, accessibility, and quality of both population-based and individual oral health services.

Logic models can be useful tools in planning, developing, monitoring, and refining oral health programs. A well-developed logic model portrays the process through which a program plans to accomplish its goals and objectives by linking program inputs, resources, and activities to desired products and short-term, intermediate, and long-range outcomes. Logic models can be applied on multiple levels, including the program level and the individual intervention level. Because they display the context in which a program is conducted, logic models can be used to focus and plan program evaluations and other activities. Resources for applying, developing, and using logic models in oral health are available under "Infrastructure Development Tools" on the CDC Oral Health Web site at www.cdc.gov/oralhealth/library/infrastructure.htm.

A logic model for developing an overall oral health program is displayed in Figure 1.

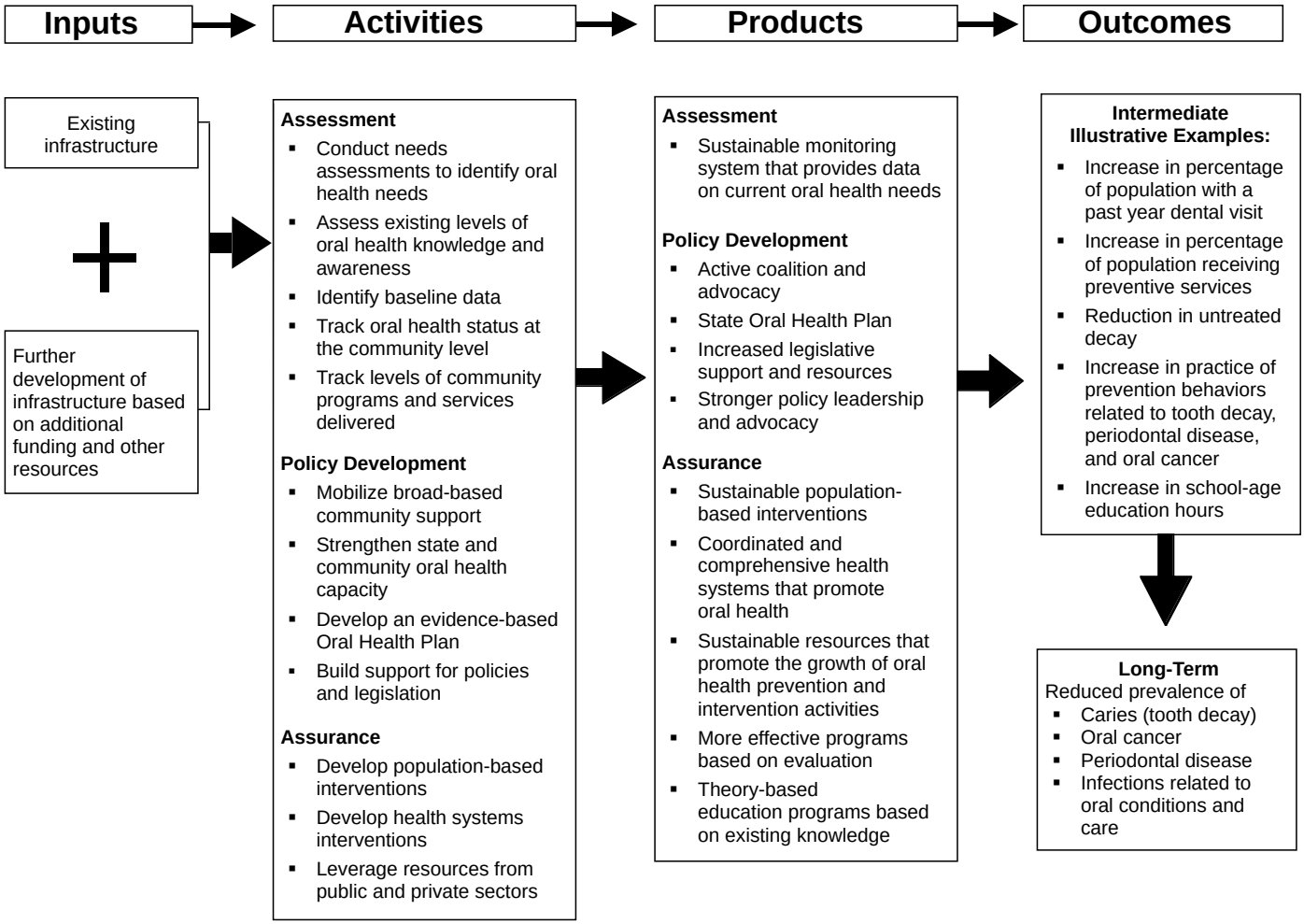
Program Management and Administration

To conduct effective state programs for oral disease prevention and control, states must have an adequate oral health infrastructure. A key component of this infrastructure is at least one staff member with the capacity to manage and lead programs. Results of a 1993 survey showed that states with full-time state dental directors conduct more oral health-related assessments, public policy development, and assurance of services needed to achieve oral health goals and objectives than states with part-time directors.[22]

To promote effective leadership and management of oral health programs, states should

- Maintain a full-time dental director position within the state health department and encourage local health departments with jurisdictions that have 250,000 or more people to do the same. These positions should be filled by dental professionals with public health training.
- Establish program staff positions to carry out the activities that support the core public health functions of assessment, policy development, oral health planning, and assurance. These positions should give state agencies the capacity to provide comprehensive surveillance and epidemiology

Figure 1: Global Logic Model for Oral Health Programs



services, offer sound financial management and administrative support, create viable strategic plans, and deliver multifaceted programs.

Surveillance

State-level surveillance of residents' oral health status and health-related behaviors is essential for determining state-specific trends, selecting interventions, identifying resources, and evaluating the success of interventions. Its importance is highlighted by *Healthy People 2010* Objective 21-16, which calls for an increase in the number of states that have an oral health surveillance system.[5]

The National Oral Health Surveillance System (NOHSS) is designed to help public health programs monitor the burden of oral disease, the use of the oral health care delivery system, and the status of community water fluoridation on both a state and national level. The NOHSS currently tracks the following indicators:

1. Percentage of adults who visited a dentist or a dental clinic during the prior year.
2. Percentage of adults who had their teeth cleaned by a dentist or dental hygienist during the prior year.
3. Percentage of people aged 65 or older with complete tooth loss.
4. Percentage of people served by community water systems with optimally fluoridated water.
5. Prevalence of dental sealants among K–3rd graders.
6. Percentage of K–3rd graders who have ever had tooth decay.
7. Prevalence of untreated tooth decay among K–3rd graders.
8. Incidence of invasive cancer of the oral cavity or pharynx.
9. Deaths from cancer of the oral cavity or pharynx.

NOHSS data can be accessed at www.cdc.gov/nohss.

To establish or increase their capacity to carry out oral health surveillance, states should

- Use regular, valid, and reliable data collection methods.
- Incorporate measures of oral health into existing surveys such as the Behavioral Risk Factor Surveillance System, the Youth Risk Behavior Survey, and the Pregnancy Risk Assessment Monitoring System.
- Use oral health data from national and state sources such as cancer registries, the National Health and Nutrition Examination Survey, the Water Fluoridation Reporting System, and the National Oral Health Surveillance System.
- Use the ASTDD training video, *Basic Screening Surveys: An Approach to Monitoring Community Oral Health*, and the manual, *Assessing Oral Health Needs: ASTDD Seven-Step Model*, for guidance in conducting state and community level assessments.
- Establish standards for data analysis and timely reporting.
- Provide training and technical assistance to help local agencies build their capacity to collect and analyze data.
- Allocate resources and staff for surveillance, data collection and management, quality assurance, and other tasks needed to support surveillance activities.

In addition to measuring oral health indicators, state oral health programs should periodically and systematically appraise the surveillance system they are using and identify its strengths and needed improvements.[23]

States also should build capacity to participate in ASTDD's annual survey to obtain data for the Synopsis of State and Territorial Dental Public Health Programs. This survey collects information from dental directors on state demographics, dental infrastructure and workforce, oral health program funding, staffing, and program activities. The Synopsis survey is designed to provide dental directors with data they can use in constructing "snap shots" of their state programs and their

environment. It also contains questions designed to track certain *Healthy People 2010* objectives, and provides a mechanism for state programs to track changes over time, make state-to-state and state-to-nation comparisons, and identify gaps in their state oral health systems.

Surveillance results should be presented in terms that are understandable to the public, policy makers, and others with the potential to influence oral health at the individual, community, or state levels. The ability of such decision makers to clearly and accurately comprehend the benefits and needs of oral health interventions remains critical to policy development, resource allocation, and overall program success.

An example of a logic model to guide surveillance capacity is shown in Figure 2.

State Plan

A state oral health plan should describe the burden of oral diseases and the prevalence of risk factors for them, identify high-risk populations, include objectives that prioritize and address the needs identified by surveillance and needs assessment data, and describe linkages between the state's needs and *Healthy People 2010* oral health objectives. The plan should also identify specific activities that will be undertaken to achieve each objective and the parties responsible for each of those activities.

To maximize the effectiveness of an oral health program, states should identify stakeholders and encourage them to collaborate on the development and implementation of a comprehensive oral health plan. Stakeholders may include a broad range of health care providers, consumers, advocates, and public and private organizations.

The resources needed to develop and implement a state oral health plan include sufficient funds for staff and operational expenses, expertise in using needs assessment data and developing recommendations, the capacity to produce and disseminate the plan, and the means to systematically track and evaluate its implementation.

Evaluation

Although evaluation is fundamental to public health practice, most oral health programs have not always integrated routine performance evaluation into program management. Oral health programs need to build the capacity to conduct the systematic evaluations necessary to measure their effectiveness and efficiency, demonstrate their accountability, and maintain a foundation of information to use for further program development and growth. The 1999 CDC publication, *Framework for Program Evaluation in Public Health*,[24] describes a generic outline that can be applied to the evaluation of specific program components and activities as well as to entire programs. Evaluation plans should include both qualitative and quantitative methods and describe how to evaluate a program's effectiveness in achieving the desired short-term, intermediate, and long-term outcomes. Program evaluations can also be used to identify the needs, barriers, and supporting factors associated with setting up a particular type of program and modifying existing interventions.

Using methods specified in the state oral health plan, oral health programs should measure their short-term outcomes and make any needed changes to their plans and, if necessary, to their implementation strategies. An example of a short-term outcome for a school-based sealant program is the number and demographic characteristics of those reached through the program compared with those targeted.

As oral health programs mature and develop the capacity to implement interventions and define which interventions reach what proportion of the target populations, they should evaluate the relationship between program activities and intermediate outcomes. Examples of such outcomes include the percentage of state residents with access to fluoridated drinking water, the percentage of residents with access to oral health services, the percentage of residents who use such services, the percentage of oral health care providers who assess their patients' use of tobacco and alcohol, and the net cost-benefit value of school-based sealant

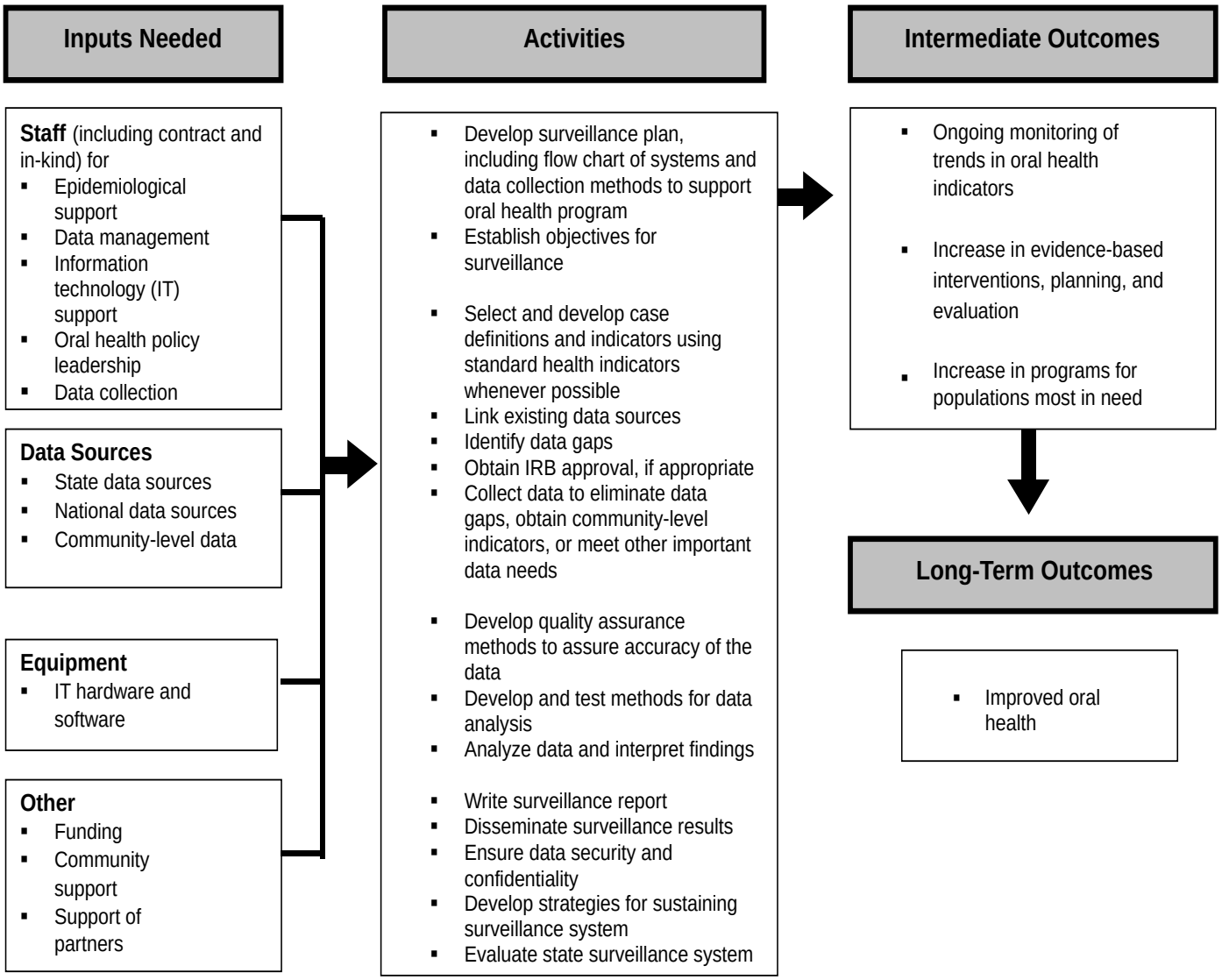
programs.

Fully mature oral health programs will also need to evaluate their success in reaching long-range objectives such as preventing dental decay, periodontal diseases, tooth loss, and oral cancer, as well as in reaching quality-of-life objectives such as reducing days missed at school or work because of oral disease.

Those who have a direct interest in program initiatives should participate in evaluation activities. Such stakeholders may include those who helped develop a state oral health plan, health care providers, community representatives, and policy makers. Including all stakeholders in the evaluation of program initiatives not only can increase the relevance, clarity, and integrity of evaluation results, it also should increase the likelihood that the results will be used to influence and support public policy.[24]

In addition to using evaluation results and lessons learned to update the state oral health plan and strengthen programs, state health officials should disseminate these findings through written reports and presentations at national, state, and local

Figure 2: Logic Model for Surveillance



State Oral Health Programs in Action

In 1998, the **Rhode Island** Department of Health did not have an oral health program or state dental director and thus lacked the leadership necessary to develop the capacity to plan, implement, and evaluate oral disease prevention programs. By linking with private partners and other agencies, however, the health department successfully gathered data revealing that (1) in 1994, 70% of elementary school children in Providence had some tooth decay; (2) in 1996, only 28% of children under age 14 enrolled in the state's Medicaid program had dental sealants; and (3) in 1998, 35% of children screened in 10 Providence inner-city elementary schools had unmet oral health needs. Motivated by these findings and provided with CDC funding, the Rhode Island Department of Education and Department of Health collaborated to establish *Healthy Schools! Healthy Kids! (HS!HK!)*, a statewide initiative to improve the oral health of Rhode Island children through school and community partnerships. Guided by the statewide *HS!HK!* Steering Committee, which included representatives from more than 30 public and private agencies, foundations, and organizations, Rhode Island hired a dental director, a health educator, and an oral health program coordinator. Subsequently, the state's Department of Health and Department of Education again worked collaboratively to establish a state regulation requiring schools to provide standardized oral health screening annually for children in grades K–5 and once more for those in 7th and 12th grades. Children found to be in need of dental care are referred for treatment. The analysis of data on oral health status, collected using a standardized screening protocol, helps program leaders define their current needs and plan future oral health program activities.

State Oral Health Programs in Action

In 1999, the director of the **Ohio** Department of Health recognized dental care as the primary unmet health care need of Ohioans and appointed a task force, chaired by a past president of the Ohio Dental Association, to study the issue and make recommendations. Other members of the task force included representatives from state and local agencies, the Ohio General Assembly, dental schools and dental residency programs, professional associations, nonprofit organizations, consumer groups, business, and labor. The task force issued recommendations designed to (1) improve and expand Medicaid and the state Children's Health Insurance Program, (2) improve the dental care delivery system, (3) support community action to improve access to oral health care, and (4) increase public awareness of issues related to oral health and access to dental care. After the task force issued its recommendations, a team of representatives from state agencies created a state action plan. As a result of the task force's efforts, access to dental care was included as one of the top 10 priorities of the Ohio Department of Health. In addition, the Ohio Dental Association has resolved to help implement the task force's recommendations.

meetings and conferences. Partner organizations such as other state agencies and state chapters of oral health and other health-related professional associations can further disseminate program evaluation results by making them available to their members and constituents.

Partnerships

Partnerships are an essential mechanism for addressing many of the factors that influence oral health and for leveraging resources for oral health programs. While the potential partners for oral health programs will vary from state to state, in most they should include other state agencies such as the departments of education and the environment; state dental, dental hygiene, public health, physician, and

nursing associations; rural and migrant health care centers; in-state schools of public health, dentistry, dental hygiene, medicine, and nursing; and any other groups with an interest in improving the oral health of the state's population. Other potential partners include managed care organizations, hospitals, nonprofit organizations, and businesses.

For example, state departments of health and education and state associations of school nurses may form partnerships to help integrate oral health promotion and services into coordinated school health programs. State health departments may also form partnerships with state oral health professional associations, environmental departments, chapters of the American Water Works Association, and, where applicable, the Rural Water Association to establish, maintain, and expand community water fluoridation.

Partners may also contribute by serving on broad-based advisory committees responsible for guiding the activities of the state oral health program. These committees may help write, critique, and suggest modifications to the state oral health plan, identify needs and problems, help set priorities, assist in coordinating services, and advocate for prevention programs and funding.

Often, these partnerships take the form of coalitions: independent groups formed to educate public officials, policy makers, program administrators, and health care professionals about oral health problems and solutions. Such coalitions may also help by promoting appropriate oral health policies and soliciting both public and private resources to provide people with better access to oral health services. Generally, the goals of coalitions are to reduce political, economic, and social impediments; systemic, organizational, and administrative obstacles; income, geographic, cultural, language, and educational barriers; and special barriers experienced by disabled, homebound, or institutionalized persons. Figure 3 provides a framework for developing an oral health coalition.

State Oral Health Programs in Action

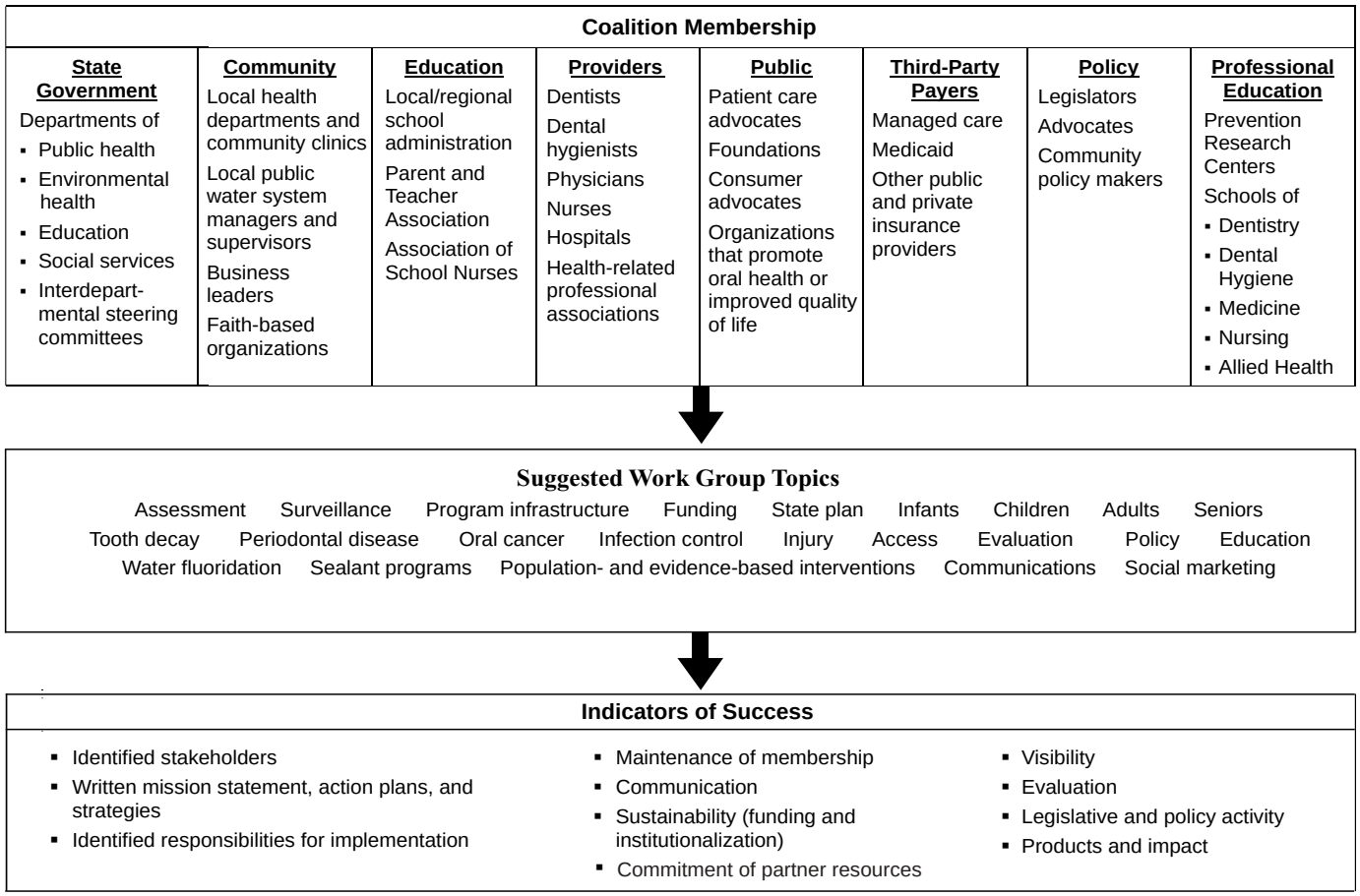
The **Washington** State Department of Public Health's Family and Community Health Program, with support from the Health Resources and Services Administration, has produced a manual, *Community Roots for Oral Health: Guidelines for Successful Coalitions*, which is based on the experiences of the Washington State Oral Health Coalition (WSOHC). Community education provided by the WSOHC has resulted in many successes, including increasing the number of public health dental sealant programs and raising the Medicaid reimbursement rates for dental care for children. The manual includes information on how to negotiate the six steps it identifies as crucial in developing and maintaining a successful coalition: (1) assessing community readiness, (2) forming the coalition, (3) building a foundation for action, (4) reviewing systems and oral health strategies, (5) developing an oral health coalition action plan, and (6) maintaining and sustaining the coalition. (See Technical Resources, page 6–24, for information on how to obtain the manual.)

Oral Health in America: A Report of the Surgeon General calls for the use of public-private partnerships to help improve the oral health of population segments disproportionately affected by oral diseases. The report supports the use of such partnerships to build and strengthen cross-disciplinary, culturally competent, community-based efforts to incorporate oral health initiatives into other, more established health programs, such as those designed to prevent tobacco use, immunize children, promote better nutrition, and encourage the use of protective gear such as mouth guards to prevent sports injuries.[1]

Policy

Public health policy is set on a range of levels, from internal program policies to legislation. In addition to establishing departmental policies that support

Figure 3: Oral Health Coalition Framework



program maintenance, state oral health programs must have the capacity to provide accurate and timely information to policy makers and others who influence guidelines, regulations, state legislation, and community ordinances. Examples of oral health-related *Healthy People 2010* objectives with public policy implications are

- 21-9. Increase the proportion of the U.S. population served by community water systems with optimally fluoridated water from 62% to 75%.
- 21-12. Increase the proportion of low-income children and adolescents who received any preventive dental service during the prior year from 20% to 57%.
- 21-13. Increase the proportion of school-based health centers with an oral health component.

State oral health programs should also have the capacity to address policy needs concerning tobacco-related issues, infection control, access to care, and the integration of oral health into other health programs such as those that address cardiovascular disease, tobacco control, diabetes, and reproductive health.

To enhance their capacity to influence public policy, oral health program personnel should provide legislators and other policy makers with ongoing education on oral health issues. They should also nurture relationships with dental professionals, physicians, professional organizations, and other private-sector representatives capable of influencing oral health policies at any level.

The National Governors Association recently convened three policy academies to help states devise and implement policies and programs addressing the oral health care of children. Delegations from 21 states have participated in these academies, including staff members from governors' offices, state dental directors, state chronic disease directors, state legislators, state Medicaid directors, and consumers. Since returning from these academies, participants have worked on state oral health plans and a variety of initiatives:

- Policy academy participants from **Alabama** helped plan the statewide Smile Alabama! campaign, which promoted the use of case managers to deliver oral health care education to pregnant women during prenatal visits, coordinated efforts by local policy councils to develop and distribute educational materials, and developed an oral health fact sheet for legislators. Alabama also held an oral health summit in December 2001 to convince additional stakeholders to support the Smile Alabama! campaign. Two years after the governor increased Medicaid reimbursement for dental procedures, the dental outreach component of the *Smile Alabama!* campaign recruited an additional 375 dentists to serve as Medicaid providers and helped an additional 40,000 children receive dental services under Medicaid.
- Academy participants from **Colorado** helped formulate the recommendations of the Colorado Commission on Children's Dental Health, which serve as the basis for Colorado's action plan. In December 2000, the commission presented nine recommendations to the governor and General Assembly. These recommendations led to the passage of three bills and two budget initiatives during the 2001 legislative session, including legislation creating a state loan repayment program for dentists and hygienists serving in areas identified as having a shortage of health care providers, the addition of dentists and hygienists to the state health professional tax credit program, and an amendment of the state Medicaid rules to allow dental hygienists to bill Medicaid directly.

Communication

In 1994, the Department of Health and Human Services' Core Functions Working Group and Steering Committee identified 10 core functions of public health. Among these is the responsibility "to inform, educate, and empower people about health issues."[25] Health communication has an integral role in accomplishing public health goals and objectives associated with knowledge, motivation, and behavior.

In some cases, however, public health officials underestimate the skills and resources needed to effectively carry out this health communication function. As a result, public health messages tend to be generic and conveyed with little consideration of the factors that will promote or hinder communication with the intended audience.

Oral health programs need to be able to communicate successfully using a variety of strategies. Program leaders should understand the principles of health communication and be able to

- Recognize the role and limitations of communication as a potential intervention for an oral health problem.
- Determine the appropriateness and feasibility of using a communication intervention to address the problem.
- Base a communication plan on formative research of both the health concern and the intended audience.
- Ensure that the health communication intervention complements and supports other interventions being used to address the problem.

Through strategic planning, effective management, and evaluation, program leaders can minimize the risk that an oral health communication initiative will have undesirable effects and increase the chances that it will achieve its intended goals and objectives.

Health communications can be used to further oral health efforts in numerous ways, including the following:

- Promote appropriate use of the multiple sources of fluoride among health care providers and parents of young children.
- Build community-wide support for water fluoridation in nonfluoridated communities.
- Increase the number of children from low-income families who have sealants.
- Educate people about the need for regular dental care and build support for including dental care in publicly funded programs such as Medicaid and the State Children's Health Insurance Program.
- Inform policy decisions about oral health issues.

CDCynergy is a resource available to oral health programs for building capacity in health communications. For those trained in its use, this program, available as an interactive CD-ROM, provides systematic and sequential guidance and decision-making support for all stages in the development and implementation of communication activities. CDCynergy promotes accountability and the importance of evaluation throughout the communication process. Versions of CDCynergy include a general use program and programs for specific communications activities, including tobacco cessation and control. See the Technical Resources at the end of this chapter for more information on CDCynergy.

Access to Services

Although regular professional dental care is an integral part of oral disease prevention and control, many children and adults do not routinely receive such care. People at lower income and education levels are less likely to receive dental services than those at higher levels. *Healthy People 2010* includes the following oral health objectives that pertain to improving access to services:

- 21-10. Increase the proportion of children and adults who use the oral health care system each year from 44% to 56%.
- 21-11. Increase the proportion of long-term care residents who use the oral health care system each year from 19% to 25%.
- 21-12. Increase from 20% to 57% the proportion of children and adolescents under age 19 from families at or below 200% of the federal poverty level who received any preventive dental service during the previous year.
- 21-13. Increase the proportion of school-based health centers with an oral health component (developmental, no baseline data or target level set).
- 21-14. Increase from 34% to 75% the proportion of local health departments and community-based health centers (including community, migrant, and homeless health centers) that have an oral health component.
- 5-15. Increase from 58% to 75% the proportion of persons with diabetes who have at least an annual dental examination.

To improve the availability of oral health services and to increase access to those services, state programs should

- Work with partner organizations to identify and fill gaps in services for high-risk populations as well as for the population in general.
- Provide technical assistance to help local health systems develop policies that integrate oral health care into the broader health care system.
- Support training to teach nondental health care providers when to refer patients for oral care services.
- Educate state legislators about the need to use federal State Children's Health Insurance Program (SCHIP) funds to expand Medicaid coverage or provide an alternative program to cover children's dental care services.
- Educate providers and underserved populations about the coverage available through Medicaid and SCHIP.
- Implement programs to repay the school loans of dental health professionals in exchange for work in underserved areas.

In one example of a successful state effort to improve access to dental services, the Ohio Bureau of Oral Health Services works with Head Start programs on action plans to ensure that children enrolled in Head Start receive necessary dental care. In some participating programs, more than 80% of the Head Start children complete their dental treatment. In another example, the Delaware state dental program works closely with the state dental society and the Delaware Board of Dental Licensing to increase the number of dentists who accept Medicaid patients.[20]

Professional Development and Training

State program personnel should be trained in a variety of oral health areas that support the program's ability to maintain state-level program capacity and provide community-level training and technical assistance. Examples of oral health training include

- Training to enhance the capacity of state oral health program staff to perform core public health functions. Collectively, program staff should have training and expertise in epidemiology, quantitative and qualitative data collection and analysis, health education, health communications, community organizing, coalition building, public policy development and leadership, and program evaluation.
- Continuing education seminars on issues related to oral diseases such as tooth decay in early childhood, infection control, and tobacco-use prevention and cessation.
- Training for personnel in local agencies in the assessment and surveillance of oral health problems, needs, and resources; policy development; community organization; and program implementation and evaluation.

Table 3. Key Funding Variables and Estimated Capacity-Building Funding Requirements for Four Models of State Oral Health Programs

Key Funding Variables		Model #1	Model #2	Model #3	Model #4
State population		2,500,000	4,500,000	5,500,000	11,500,000
Number of *Healthy People 2010* oral health objectives targeted by the state		4	8	5	10
Number of local health departments with dental programs		1	2	20	18
Annual budget for infrastructure and capacity elements	Lower Estimate	$ 445,000	$1,027,000	$2,868,000	$3,371,000
	Upper Estimate	$ 722,000	$1,651,000	$4,449,000	$4,760,000

Source: ASTDD, 2000.

- CDC's Basic Water Fluoridation training course for engineers and oral health personnel, which includes training in the Water Fluoridation Reporting System. Those who receive this training should, in turn, train other state engineers and oral health program personnel, operators of local water systems, and health professionals.

State programs should also assess and monitor the capacity of the state oral health workforce and identify those oral health needs that go unmet. To help respond to any workforce shortages, oral health programs should work closely with their academic and professional association partners.

Funding

The Association of State and Territorial Dental Director's *Building Infrastructure and Capacity in State and Territorial Oral Health Programs*[20] includes four models for state oral health programs that illustrate estimated program funding needs for programs with various levels of program resources, various environments (e.g., state populations, state and local infrastructure, political factors), and various strategic factors (e.g., the number of *Healthy People 2010* objectives targeted by the state). The oral health program directors of the states selected as models used a standardized worksheet to determine their lower and upper budget estimates. Overall, the estimated amount needed to build sufficient program infrastructure and capacity ranged from $445,000 to $4,760,000. Table 3 illustrates the four funding estimates and a sample of the comparison factors for each of the state models.

These estimates provide a general indication of funding needs for oral health programs. However, given the variation in state and local infrastructures, program priorities, existing resources, and strategies, each state should determine the funding it requires to achieve optimal oral health for all its citizens.

National Leadership

National Agenda and Policies

CDC, along with other Department of Health and Human Services agencies, has been a major contributor to the "National Oral Health Call to Action," a national planning process to advance oral health. (See the Technical Resources at the end of this chapter.) This initiative addresses recommendations in the Surgeon General's report on oral health.[1] The "National Oral Health Call to Action" is intended to engage communities, stimulate initiatives, and expand efforts to improve American's oral health and eliminate oral health disparities through effective collaboration among stakeholders at all levels, including patients, health care providers, communities, and policy makers. The "Call to Action" has been led by the Partnership Network Group, which includes the Office of the Surgeon General, CDC, and NIH's National Institute of Dental and Craniofacial Research (NIDCR) as well as national health, advocacy, and dental trade organizations; foundations; and other federal agencies with oral health programs.

Some of the goals of the "Call to Action" are

- To change how people perceive oral health and disease so that oral health becomes an accepted component of general health.
- To promote oral health research and education and apply scientific findings effectively to improve oral health.
- To build an effective health infrastructure that meets the oral health needs of all Americans and integrates oral health effectively into overall health and to ensure the development of a responsive, competent, diverse, and "elastic" workforce.
- To remove known barriers that prevent people from accessing oral health services.
- To use public-private partnerships to improve the oral health of population segments who suffer disproportionately from oral diseases.

When completed, the oral health plans developed or reiterated in response to the "Call to Action" should express broadly shared visions and recommend common activities that oral health programs throughout the nation can use.

Through cooperative agreements and its "Support for State Oral Disease Prevention Programs" initiative, CDC is providing support to 12 states and 1 territory to strengthen their core oral health infrastructure and capacity and to reduce inequities in the oral health of their residents through the proven strategies of community water fluoridation and school-based or school-linked dental sealant programs for children at high risk for caries. CDC is also providing this territory and 12 states with technical assistance to help them develop surveillance systems, oral health plans, oral health-related communication strategies, and program evaluation capabilities.

Forging National Partnerships

CDC, along with NIH, the Centers for Medicare & Medicaid Services, and the Indian Health Service, is responsible for coordinating efforts to achieve the *Healthy People 2010* oral health objectives. With these federal partners, CDC guides the efforts of a national oral health consortium, which also includes 12 other national, state, and local health agencies and nongovernmental organizations. Through the National Oral Health Surveillance System (NOHSS), CDC is also leading efforts to monitor state-level progress in meeting many of these objectives.

In 2002, CDC was one of four operating divisions within the Department of Health and Human Services to sign a memorandum of understanding (MOU) with the Academy of General Dentistry (AGD) to help meet the national objectives set by *Healthy People 2010*. AGD is a nonprofit organization of 37,000 general dentists whose mission is to foster the proficiency of general dentists through continuing education. The specific objectives of this effort are to

- Help develop and implement measures to improve access to dental care for low-income children and adults.
- Increase the demand for and availability of dental continuing education courses that address the oral health needs of at-risk toddlers, children with special needs, and seniors.
- Work with other health care organizations to educate health care professionals, policy makers, and the public about the relationship between oral health and general health and about the proven effectiveness of oral disease prevention measures such as the fluoridation of public water supplies, regular tooth brushing, the use of dental sealants, and tobacco-use cessation.
- Promote oral health literacy by developing appropriate materials, including curricula for schoolchildren.

CDC's current cooperative agreement with the Association of State and Territorial Dental Directors supports key activities, including the annual National Oral Health Conference, the Best Practices Project, the ongoing implementation of the National Oral Health Surveillance System, and the compilation of the State Synopses. This cooperative agreement also supported development of the report, *Building Infrastructure and Capacity in State and Territorial Oral Health Programs*.[20] As part of the process of gathering information for the infrastructure report, states were surveyed on the gaps in their infrastructure. Survey results demonstrated high needs for establishing oral health surveillance and having adequate staff with epidemiologic and other public health expertise to implement essential dental public health services. The report recommended 10 key elements that state oral health programs need to build the infrastructure and capacity to achieve the *Healthy People 2010* objectives.[20] To help states develop the core capacity to operate effective programs, CDC used these findings to structure the cooperative agreements awarded to states in 2001 and 2002 under its "Support for State Oral Disease Prevention

Programs." As a follow-up, the Best Practices Project is collecting information on the successful practices of state oral health programs, and this information will be disseminated as a series of reports.

CDC also has a cooperative agreement with Oral Health America to develop infrastructure initiatives related to oral disease prevention and health promotion. Activities include building and strengthening state and local oral health coalitions; expanding education programs to discourage the use of smokeless tobacco; getting the oral health community more involved in tobacco-use prevention and cessation efforts; increasing the number of dental sealant programs for children at high risk for caries; enhancing school-based oral health education; and expanding initiatives that address special populations, such as Special Olympics' Special Smiles and Oral Health America's Campaign for Oral Health Parity, a communications effort to raise awareness of oral health issues among policy makers, opinion leaders, and the public.

Communicating Key Messages

CDC has led national efforts to guide health professionals and consumers in the appropriate use of fluorides."Brush Up on Healthy Teeth," for example, is a CDC-led health communications program designed to provide parents with specific information related to the oral health of their young children, including appropriate use of fluoride products such as toothpaste and mouth rinses. The"Brush Up on Healthy Teeth" materials are available in English and Spanish and can be accessed at www.cdc.gov/oralhealth.

Stimulating Priority Research and Evaluation

Through the Prevention Research Centers (PRCs), CDC is supporting oral health research at the community level. The PRCs are a network of academic research centers that have cooperative agreements with CDC to conduct research on the prevention and control of chronic disease. Within the PRCs, an oral health network coordinating center helps integrate oral health prevention research into the PRCs' broad agenda; enhances collaboration with other PRCs, state health departments, schools of dentistry, and experts from other disciplines; and increases the PRCs' visibility as a resource for developing and implementing applied, community-based oral health research. Promising community-level intervention efforts currently being evaluated include approaches that seek to improve oral health and overall quality of life among the very young, the elderly, the poor, and members of some racial and ethnic minority groups.

CDC also conducts intramural research focused on issues of interest to states and communities, including cost-effectiveness analyses of prevention strategies such as community water fluoridation and school-based and school-linked sealant programs. In addition, CDC collaborates with NIDCR to conduct workshops designed to guide research initiatives. Recently, these workshops have focused on fluoride research. Information on NIDCR research programs, including those that focus on behavioral intervention studies, is available at www.nidr.nih.gov.

Working collaboratively with the states that receive CDC support for core oral health services and prevention programs, CDC has developed a framework for state program evaluation. This framework includes common indicators for evaluating program capacity and success in promoting best processes. An evaluation toolkit developed as part of this effort is available at www.cdc.gov/oralhealth/library/infrastructure.htm. (See the Technical Resources section, page 6–24.)

Promoting Science-Based Professional Development

CDC provides various training opportunities in program design, evaluation, and surveillance. One of these is a residency program in dental public health for dentists who have a graduate degree in public health from an accredited U.S. or Canadian school. Participants have the opportunity to develop their skills in areas such as surveillance, epidemiology research methods, community prevention interventions, program administration, and evaluation as they address oral health problems

through interdisciplinary efforts. Fellowships for this program are available through the Association of Schools of Public Health (ASPH)/CDC Public Health Fellowship Program. Established in 1995, this program addresses the emerging needs of public health by providing graduates of ASPH-member schools with leadership and professional opportunities at CDC and its sister agency, the Agency for Toxic Substances and Disease Registry. CDC's Public Health Prevention Services Program also offers positions with an oral health focus. In this 3-year program, participants receive two 6-month work assignments within CDC, followed by a single 2-year assignment in a state or local health department.

Since 2000, CDC, the American Association of Public Health Dentistry, the ASTDD, and HRSA's Maternal and Child Health Bureau (MCHB) have cosponsored the annual National Oral Health Conference. This conference provides an opportunity for university-based researchers and people working in dental public health to share information about promising oral health programs, the latest oral health-related research, and national-, state-, and community-level policy initiatives. Recent sessions have focused on issues such as maintaining a viable state oral health program, advancing oral health policy at the state level, obtaining community-specific oral health data, meeting dental workforce and training needs, improving the curricula of public health programs, improving Medicaid and SCHIP services for children, and evaluating school-based oral health programs.

Cultivating Sustainable Funding Streams

CDC supported and worked with the Association of State and Territorial Dental Directors on its infrastructure document, which describes the core elements and funding (Table 3) necessary for a successful oral health program. Possible funding sources for comprehensive state oral health programs include state general funds, block grants from CDC for preventive health and health services and from HRSA for maternal and child health, and other federal sources. The federal Children's Health Act of 2000 (P.L., 106-310) is another potential funding stream that authorizes grants to states and tribes for prevention programs such as community water fluoridation and school sealant programs. Public-private partnerships, as advocated by the "Call to Action," may also bring additional resources to state oral health programs and help to strengthen their relationships with private practitioners, the business community, voluntary organizations, and other public programs.

Public funding can be supplemented by private grants at multiple levels. Grantmakers in Health, a nonprofit educational organization that helps foundations and corporate-giving programs improve the nation's health, has published a bulletin about opportunities to promote oral health and the resources required to pursue those opportunities. The Robert Wood Johnson Foundation (RWJF), the largest philanthropic organization devoted to health and health care in the United States, recently reinvigorated its commitment to address the urgent oral health needs of the nation. Although a $19 million initiative to stimulate change in the dental workforce and community practice is the cornerstone of the RWJF strategy, the foundation also supports projects to promote oral health in schools, in communities, and through state programs.

Progress to Date and Future Challenges

Although progress has been made in building state oral health programs and identifying successful practices in a range of areas, much remains to be done. *Oral Health in America: A Report of the Surgeon General*[1] called for recognizing oral health as an essential component of overall health. To effectively promote oral health, state public health agencies will need to establish the infrastructure necessary to develop, deliver, and evaluate their programs. CDC is helping states to build the leadership and capacity necessary to conduct surveillance, develop state plans, work with coalitions, strengthen prevention programs, and evaluate state efforts. Resources developed to assist funded states are available on CDC's Oral Health Web site: www.cdc.gov/

oralhealth/library/infrastructure.htm. CDC continues to work with states to define performance indicators for use in evaluating the outcomes of their programs. In addition, through workshops and state visits, CDC provides technical assistance to help states develop comprehensive and robust oral health programs.

In developing approaches to improve oral health in the general population, as well as in target groups that suffer disproportionately from oral diseases, states and communities should use evidence-based strategies and model their approaches on previously successful practices that can be adapted and replicated in their communities. Public health officials can learn about effective preventive strategies through the work of the Task Force on Community Preventive Services and the Association of State and Territorial Dental Director's Best Practices Project. CDC will continue to work with ASTDD to identify program practices shown to be successful by measurable, comparable criteria. At the same time, however, we must continue to develop and evaluate promising new approaches to preventing oral disease among people of all ages. Much of this evaluation can be done through CDC's Prevention Research Centers, which can conduct oral health research at the community level. Applied research should reveal additional approaches for preventing oral disease and promoting oral health.

To more effectively monitor trends in oral disease, we need to expand surveillance efforts at the national and state levels. These expanded efforts should include periodic updating of the eight indicators in the National Oral Health Surveillance System and active participation by states in the Water Fluoridation Reporting System. The information gathered through such surveillance is essential to monitoring state and national progress toward the *Healthy People 2010* objectives. Currently, only a dozen states have used standardized methods to collect indicators of children's oral health status; such methods need to be adopted by all states if data are to be comparable throughout the nation. Each state should also create a dedicated position for an epidemiologist who can guide data collection and analyze these data. CDC can play a role in translating and disseminating this information back to the states, community planners, and public policy makers.

Finally, CDC will continue to communicate the successes of state programs as well as intervention and surveillance results to public health officials, policy makers, and the general public. We may do so by traditional methods such as disseminating guidelines and recommendations, as well as by using new technologies, including Web-based and distance-learning approaches. In conjunction with the“Call to Action,” these communication efforts can help set the national health agenda by identifying new opportunities to eliminate disparities and improve the oral health of the nation. Securing the resources to establish and maintain comprehensive state oral health programs remains a difficult challenge. However, by diligently quantifying oral health problems and needs and showing that evidence-based solutions are available, CDC and its many partners are working to meet this challenge.

Technical Resources

The resources listed below are in addition to those already cited within the chapter.

Healthy People 2010 Oral Health Objectives
www.healthypeople.gov/Document/HTML/Volume2/21Oral.htm.

The Guide to Community Preventive Services: Oral Health
www.thecommunityguide.org/oral.
A summary of this document is available at www.cdc.gov/mmwr/preview/mmwrhtml/rr5021a1.htm.

Fluoridation
Recommendations for using fluoride to prevent and control dental caries in the United States. *MMWR Recomm Rep* 2001;50(RR-14):1-42. www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm.

Sealants
Impact of targeted, school-based dental sealant programs in reducing racial and economic disparities in sealant prevalence among schoolchildren—Ohio, 1998-1999. *MMWR Morb Mortal Wkly Rep* 2001;50(34):736-8. www.cdc.gov/mmwr/preview/mmwrhtml/mm5034a2.htm.

Evaluation
Framework for Program Evaluation in Public Health. www.cdc.gov/eval/framework.htm.

State Infrastructure
Tools to help states to plan and implement oral health promotion activities are available at www.cdc.gov/oralhealth/library/infrastructure.htm.

Several tools for building and enhancing state infrastructure are available on the Web site of The Association of State and Territorial Dental Directors. www.astdd.org.

Building Coalitions
Community Roots for Oral Health: Guidelines for Successful Coalitions. Washington State Department of Health, Community and Family Health. Available at www.doh.wa.gov/cfh/OralHealth/manuals/Roots/Roots.html or by calling 360-236-3507.

National Oral Health Planning Process
The national oral health "Call to Action" is an effort whose mission is to improve the oral health of the nation. www.nidr.nih.gov/sgr/calltoaction/index.asp.

U.S. Surgeon General's Report
Oral Health in America: A Report of the Surgeon General. www.surgeongeneral.gov/library/oralhealth.

Policy
A description of the National Governors Association Policy Academies on Improving Oral Health Care for Children is available at www.nga.org/center/divisions/1,1188,C–ISSUE–BRIEF^D–3915,00.html.

Oral Health America's annual report card on the nation's oral health, based on state-level data, is available at www.oralhealthamerica.org/Report%20Card.htm.

Communication
Information on CDCynergy, a CD-Rom that provides systematic guidance and decision-making support throughout the communication planning process, is available at www.cdc.gov/cdcynergy and www.sophe.org.

Garnering Foundation Support
Grantmakers in Health has released an issue focus bulletin that advises foundations about needs and opportunities to promote oral health. It is available at www.gih.org/usr–doc/if–oral%20health.pdf.

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